UNBRIDLED LEARNING
THE VISION FOR KENTUCKY'S FUTURE

GRADE

4

# KENTUCKY

## K-PREP

Kentucky Performance Rating For Educational Progress

# MATH SAMPLE ITEMS

Spring 2013

EVERY CHILD
PROFICIENT & PREPARED FOR SUCCESS
KENTUCKY DEPARTMENT OF EDUCATION

The following are the general guides that will be used to evaluate your responses to short-answer and extended-response questions in this test.

# Kentucky Short-Answer Questions General Scoring Guide

| | |
|---|---|
| **Score Point 2** | • You complete all components of the question and communicate ideas clearly.<br>• You demonstrate an understanding of the concepts and/or processes.<br>• You provide a correct answer using an accurate explanation as support. |
| **Score Point 1** | • You provide a partially correct answer to the question and/or address only a portion of the question.<br>• You demonstrate a partial understanding of the concepts and/or processes. |
| **Score Point 0** | • Your answer is totally incorrect or irrelevant. |
| **Blank** | • You did not give any answer at all. |

# Kentucky Extended-Response Questions
# General Scoring Guide

| | |
|---|---|
| **Score Point 4** | • You complete all important components of the question and communicate ideas clearly.<br>• You demonstrate in-depth understanding of the relevant concepts and/or processes.<br>• Where appropriate, you choose more efficient and/or sophisticated processes.<br>• Where appropriate, you offer insightful interpretations or extensions (generalizations, applications, analogies). |
| **Score Point 3** | • You complete most important components of the question and communicate clearly.<br>• You demonstrate an understanding of major concepts even though you overlook or misunderstand some less-important ideas or details. |
| **Score Point 2** | • You complete some important components of the question and communicate those components clearly.<br>• You demonstrate that there are gaps in your conceptual understanding. |
| **Score Point 1** | • You show minimal understanding of the question.<br>• You address only a small portion of the question. |
| **Score Point 0** | • Your answer is totally incorrect or irrelevant. |
| **Blank** | • You did not give any answer at all. |

**1**

A school bought 240 calculators. The school will make class sets containing exactly 26 calculators. How many class sets of calculators can be made with the calculators the school bought?

**A** 6
**B** 9
**C** 10
**D** 11

**2**

Jordan's class collected 119 paperback books to donate to the library. Casey's class collected 105 books. Students from the two classes stacked all the books they could in groups of 9 and put all the remaining books in another stack. How many stacks of books did the two classes have?

**A** 24
**B** 25
**C** 26
**D** 28

**3**

These clues describe a number:

- The digit in the hundred thousands place is the quotient of 16 and 2.
- There are no thousands.
- The digit in the ten thousands place is 2 less than the digit in the hundred thousands place.
- The digit in the hundreds place is greater than 1, is an odd number, and is less than 5.
- The digit in the tens place is the product of 3 and 3.
- The digit in the ones place is 1 more than the digit in the thousands place.

Which number do the clues describe?

**A** 86,391
**B** 820,131
**C** 860,391
**D** 863,910

**4**

During a math activity, Raymond pulled triangles and a quadrilateral out of a bag. He shared the following descriptions about the polygons.

- The first triangle had three angles, each less than 90 degrees.
- The second triangle had two angles less than 90 degrees and one angle equal to 90 degrees.
- The third triangle had two angles less than 90 degrees and one angle greater than 90 degrees.
- The quadrilateral had two angles less than 90 degrees and two angles greater than 90 degrees.

How many polygons did Raymond pull out of the bag that had at least one obtuse angle?

**A** 1
**B** 2
**C** 3
**D** 4

**5**

The table shows how much water was added to a container by a teacher and how much of the container's water was used by the students on a daily basis. The container was $\frac{8}{12}$ full of water before the teacher added water on Monday.

**Daily Amounts of Water Added and Used in Classroom Container**

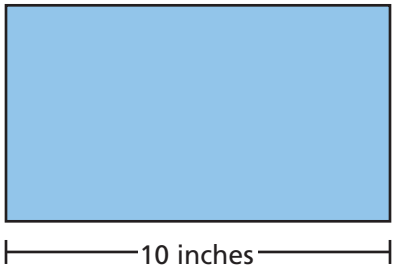
| Amount of Water | Monday | Tuesday | Wednesday | Thursday |
|---|---|---|---|---|
| Amount Teacher Added | $\frac{4}{12}$ | $\frac{0}{12}$ | $\frac{10}{12}$ | $\frac{0}{12}$ |
| Amount Class Used | $\frac{0}{12}$ | $\frac{10}{12}$ | $\frac{1}{12}$ | $\frac{8}{12}$ |
| Total Amount at the End of the Day | ? | ? | ? | ? |

Which row correctly completes the table?

| | | | | | |
|---|---|---|---|---|---|
| **A** | Total Amount at the End of the Day | $\frac{0}{12}$ | $\frac{8}{12}$ | $\frac{1}{12}$ | $\frac{8}{12}$ |
| **B** | Total Amount at the End of the Day | $\frac{4}{12}$ | $\frac{10}{12}$ | $\frac{9}{12}$ | $\frac{8}{12}$ |
| **C** | Total Amount at the End of the Day | $\frac{4}{12}$ | $\frac{10}{12}$ | $\frac{11}{12}$ | $\frac{8}{12}$ |
| **D** | Total Amount at the End of the Day | $\frac{12}{12}$ | $\frac{2}{12}$ | $\frac{11}{12}$ | $\frac{3}{12}$ |

**6**

The top of a rectangular box is shown below.




The area of the top of the box is 80 square inches.

**Part A** What is the width of the top of the box? Show your work or explain your answer.

**Part B** What is the perimeter of the top of the box? Show your work or explain your answer.

**RUBRIC**

| | |
|---|---|
| **Score Point 2** | • You complete all components of the question and communicate ideas clearly.<br>• You demonstrate an understanding of the concepts and/or processes.<br>• You provide a correct answer using an accurate explanation as support. |
| **Score Point 1** | • You provide a partially correct answer to the question and/or address only a portion of the question.<br>• You demonstrate a partial understanding of the concepts and/or processes. |
| **Score Point 0** | • Your answer is totally incorrect or irrelevant. |
| **Blank** | • You did not give any answer at all. |
| **Note:** No part can be incomplete or incorrect and receive full credit. | |

**Correct Answer:**

**Part A:** 8 inches
The area of a rectangle can be found by multiplying the length times the width.
$10 \times w = 80$
$10 \times 8 = 80$
$w = 8$

OR similar explanation

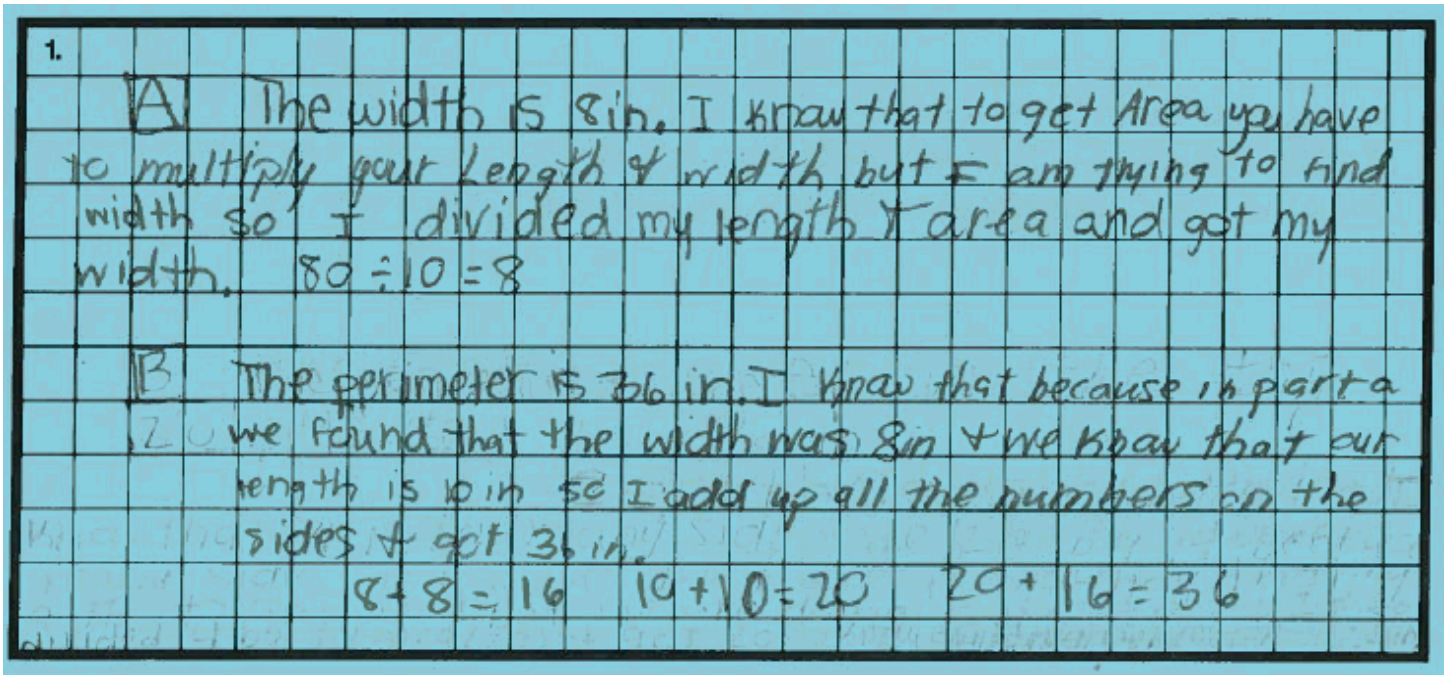
**Part B:** 36 inches
The perimeter of a rectangle can be found by adding both sides of the length to both sides of the width. $\left(10+10\right)+\left(8+8\right)=36$

OR similar explanation

**GRADE 4 — Mathematics**

# Annotated Student Response

**SAMPLE 2-POINT RESPONSE**




**ANNOTATION — 2-POINT RESPONSE**

The student completes all components of the question and communicates ideas clearly.

Part A: The student provides the correct width of "*8 in*", and explains, "*…to get area you have to multiply your length and width…so I divided my length & area and got my width. 80 ÷ 10 = 8*"

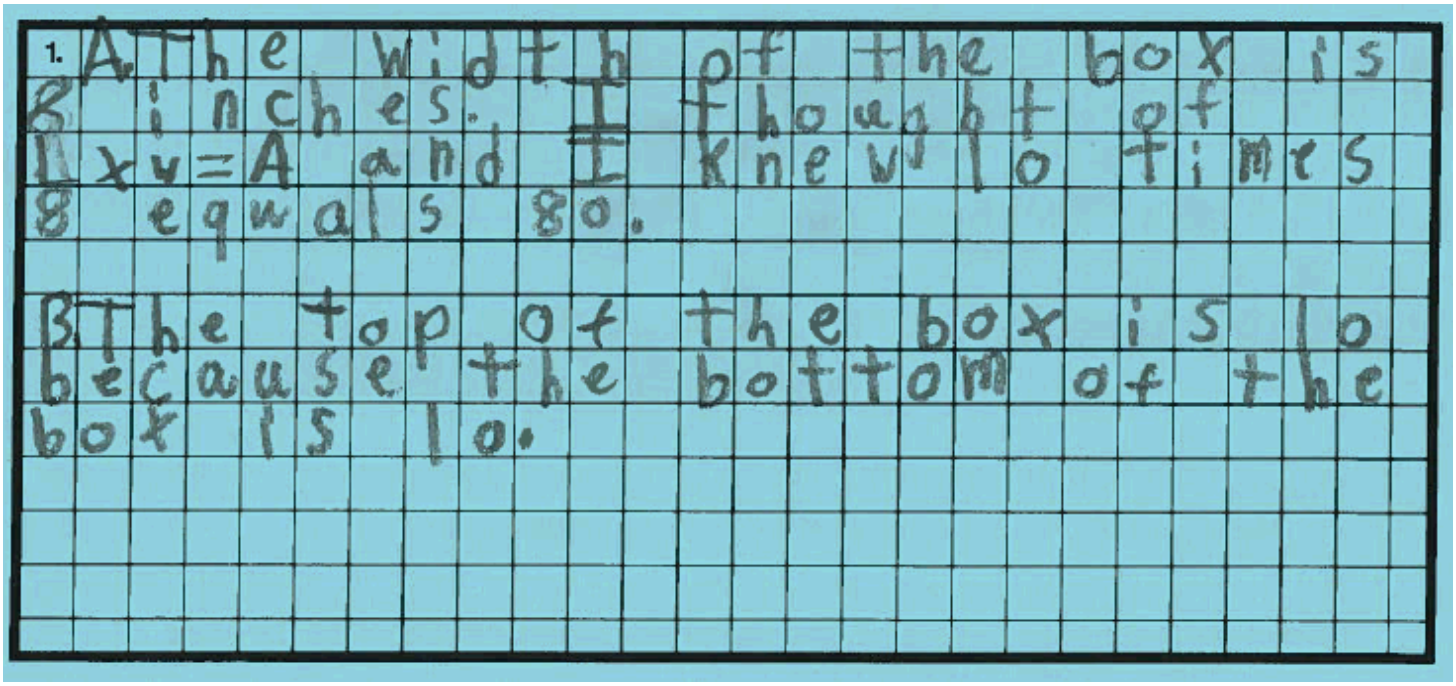
Part B: The student provides the correct perimeter "*36 in.*", and explains, "*…the width was 8 in & we know our length is 10 in so I add up all the numbers on the sides & got 36 in.*" "*8 + 8 =16, 10 +10 =20, 20 + 16 = 36.*"

**Overall**, the student earns 2 points.

GRADE 4 —Mathematics

# Annotated Student Response

**SAMPLE 1-POINT RESPONSE**




**ANNOTATION — 1-POINT RESPONSE**

The student provides a partially correct answer to the question and addresses only a portion of the question.

Part A: The student provides a correct width of *"8 inches"* and explains his answer, *"…L x W = A and I knew 10 times 8 equals 80."*

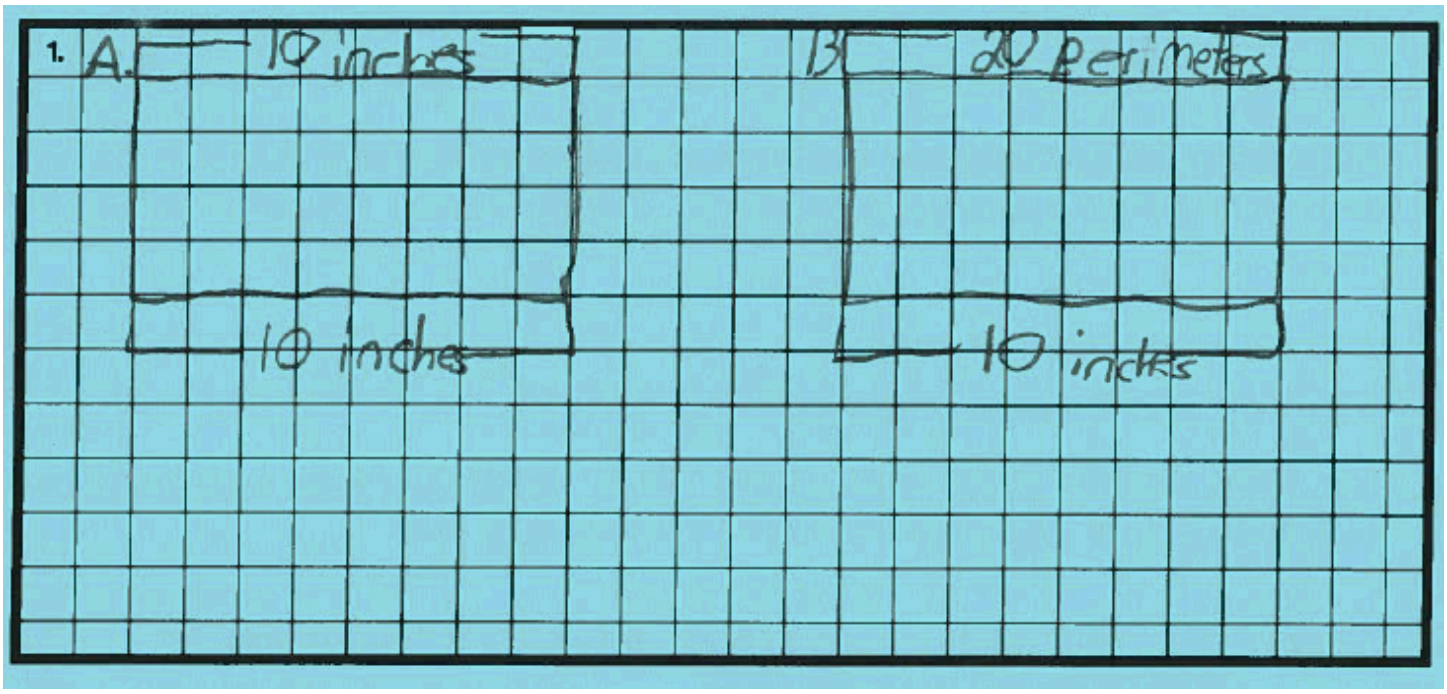
Part B: The student provides an incorrect answer of *"10"* and provides an explanation that does not demonstrate an understanding of the task.

**Overall**, the student earns 1 point.

**GRADE 4 —Mathematics**

# Annotated Student Response

**SAMPLE 0-POINT RESPONSE**




**ANNOTATION – 0-POINT RESPONSE**

The student's answer is totally incorrect.

**Overall**, the student earns 0 points.

**7**

Paper-mache is a material made from strips of paper and paste that can be used to form three-dimensional shapes. Sam cut strips of paper to use in a paper-mache art project.

- He cut 3 yellow strips of paper.
- He then cut 4 blue strips of paper, each $\frac{7}{12}$ inch wide.

Sam placed the yellow strips he cut side by side. The total width of the 3 yellow strips measured $\frac{9}{12}$ inch. Then he placed the blue strips side by side.

**Part A** Write an equation or draw a visual representation showing the total width, in inches, of the blue strips.

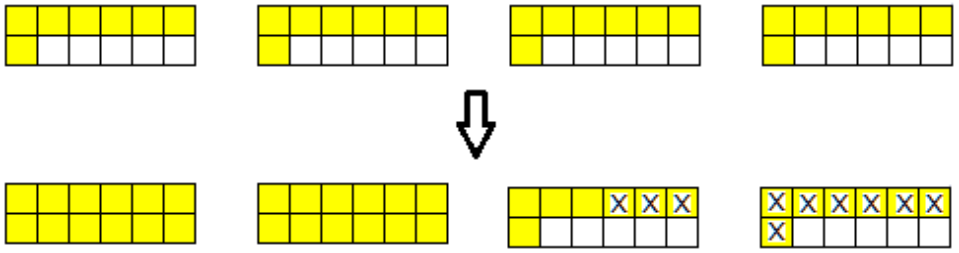
**Part B** Write an equation showing how many more total inches wide the blue strips were than the yellow strips.

| RUBRIC | |
|---|---|
| **Score Point 2** | • You complete all components of the question and communicate ideas clearly.<br>• You demonstrate an understanding of the concepts and/or processes.<br>• You provide a correct answer using an accurate explanation as support. |
| **Score Point 1** | • You provide a partially correct answer to the question and/or address only a portion of the question.<br>• You demonstrate a partial understanding of the concepts and/or processes. |
| **Score Point 0** | • Your answer is totally incorrect or irrelevant. |
| **Blank** | • You did not give any answer at all. |
| **Note:** No part can be incomplete or incorrect and receive full credit. | |

**Correct Answer:**

**Part A:** $4 \times \frac{7}{12} = \frac{28}{12}$ OR $4 \times \frac{7}{12} = \frac{28}{12} = 2\frac{4}{12}$

OR



OR equivalent equation or visual representation

**Part B:**

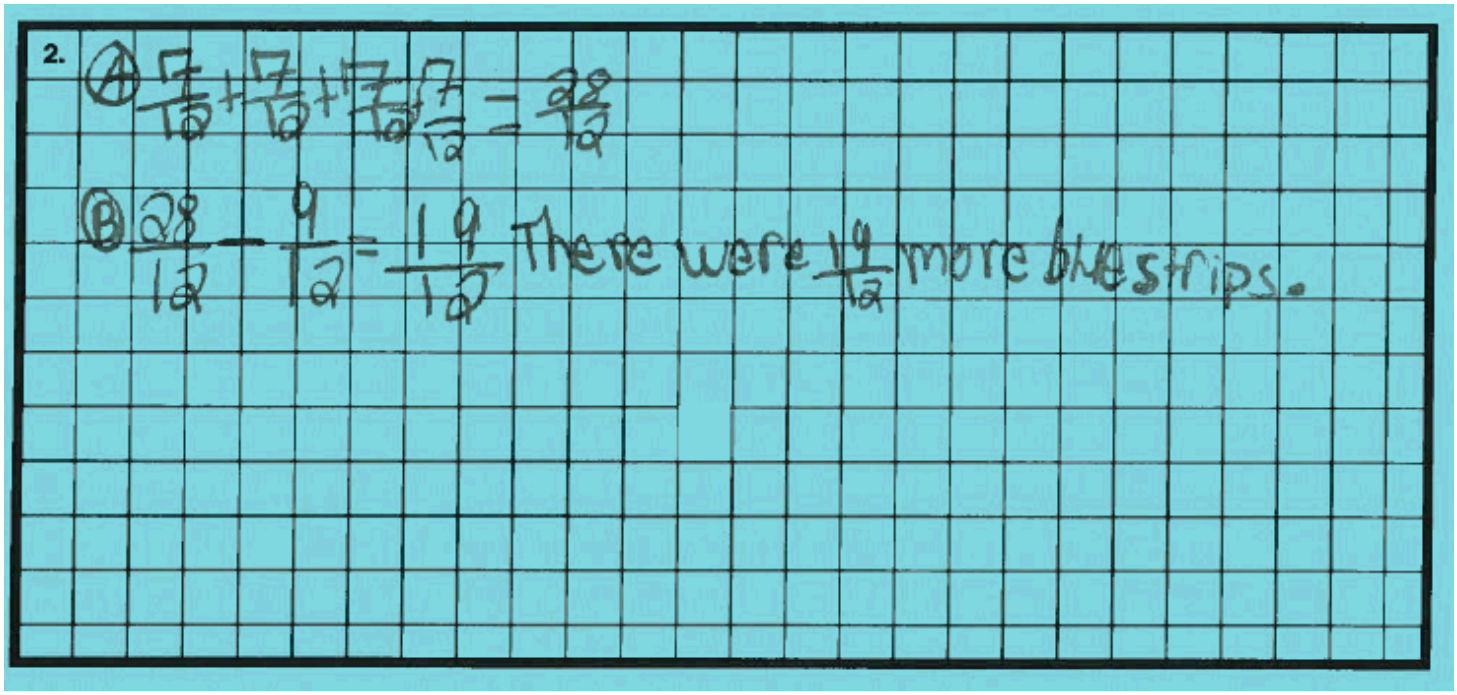
$\frac{28}{12} - \frac{9}{12} = \frac{19}{12}$ or $\frac{28}{12} - \frac{9}{12} = \frac{19}{12} = 1\frac{7}{12}$

OR equivalent equation

**GRADE 4 — Mathematics**

# Annotated Student Response

**SAMPLE 2-POINT RESPONSE**




**ANNOTATION — 2-POINT RESPONSE**

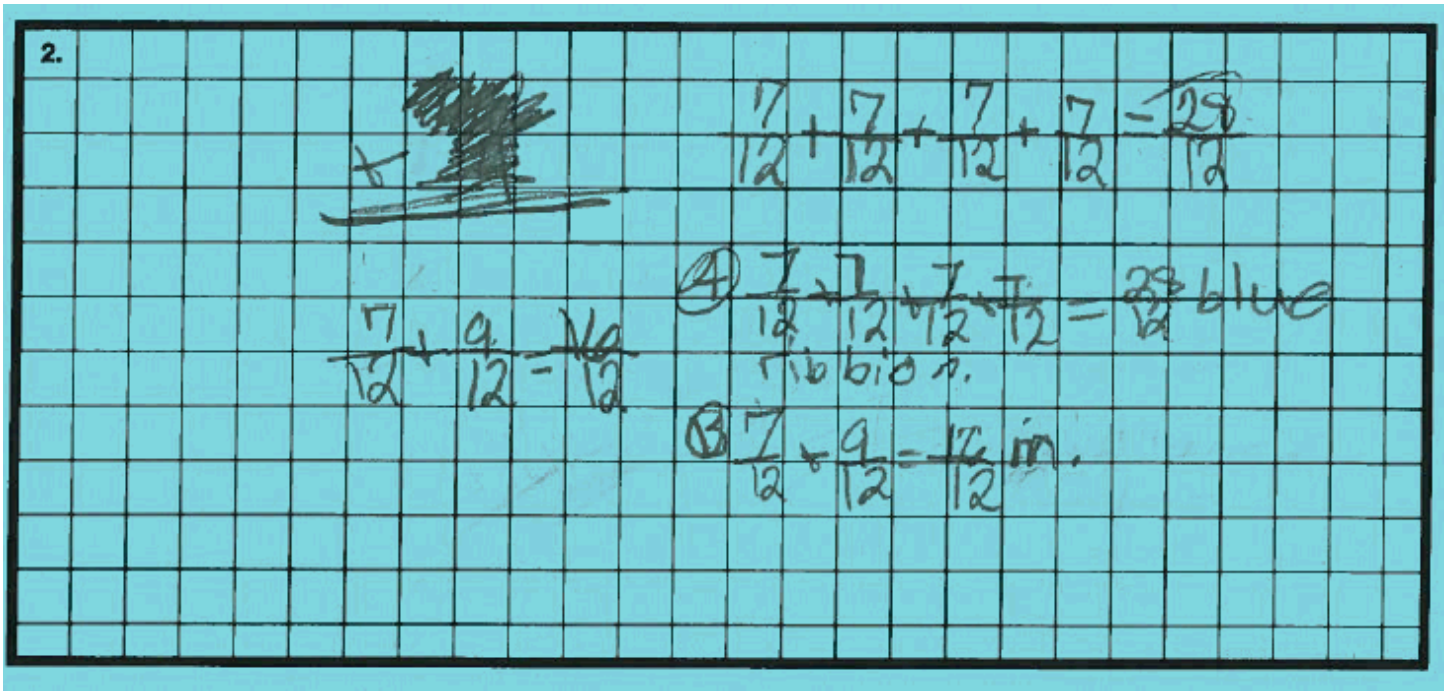
The student completes all components of the question and communicates ideas clearly.
Part A: The student provides a correct equation, *"7/12 + 7/12 + 7/12 + 7/12 = 28/12"*.
Part B: The student provides a correct equation, *"28/12 – 9/12 = 19/12"*.

**Overall**, the student earns 2 points.

**GRADE 4 — Mathematics**

# Annotated Student Response

**SAMPLE 1-POINT RESPONSE**




**ANNOTATION — 1-POINT RESPONSE**

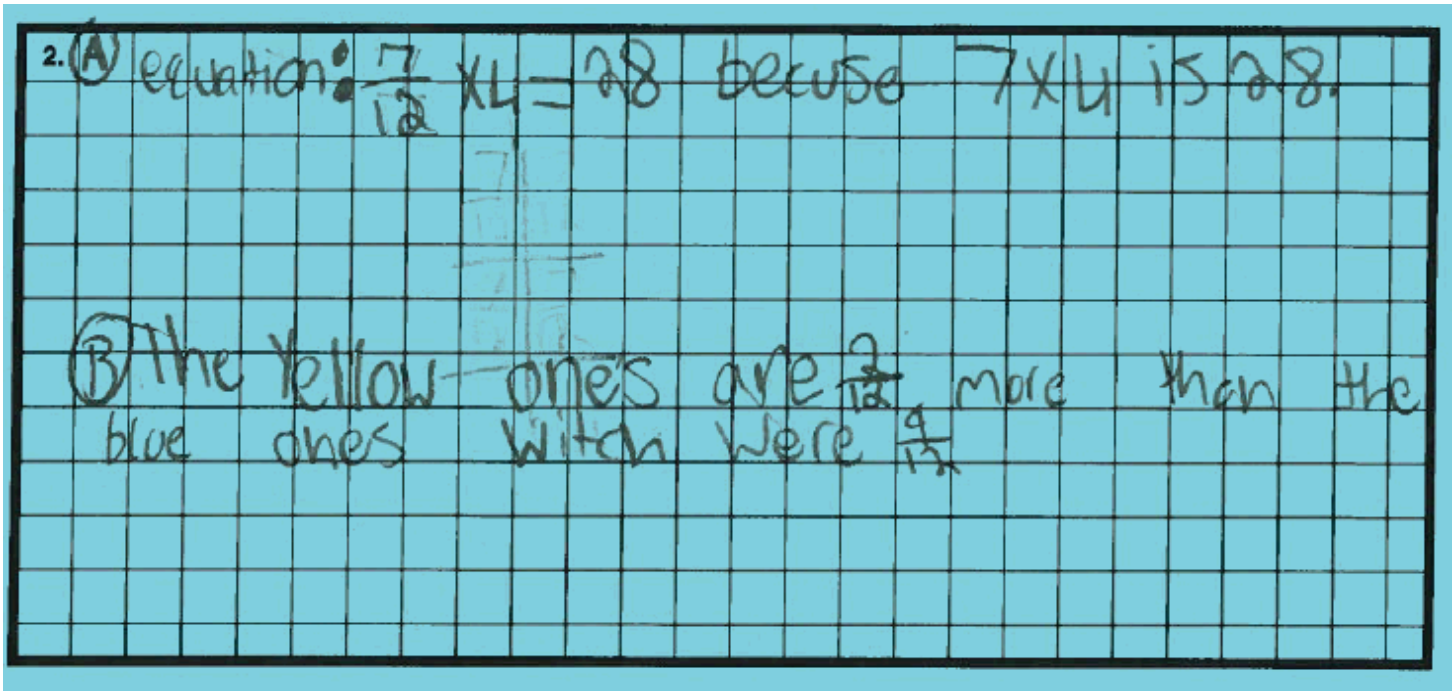
The student provides a partially correct answer to the question and addresses only a portion of the question.
Part A: The student provides a correct equation, *"7/12 + 7/12 + 7/12 + 7/12 = 28/12"*.
Part B: The student provides an incorrect equation, *"7/12 + 9/12 = 16/12"*.

**Overall**, the student earns 1 point.

**GRADE 4 — Mathematics**

# Annotated Student Response

**SAMPLE 0-POINT RESPONSE**




**ANNOTATION – 0-POINT RESPONSE**

The student's answer is totally incorrect, providing an incorrect equation for Part A and no equation for Part B.

**Overall**, the student earns 0 points.

**8**

Carmen and Sam are playing Level 1 of a video game. The game lets them collect stars in buckets. One full bucket holds 3 stars. Each star is worth 2 points.

**Part A** Carmen collects 4 full buckets of stars. She thinks she earned a total of 14 points. Is she correct or incorrect? Explain your answer and provide equations to support your explanation.

**Part B** Sam collects twice as many full buckets as Carmen. He thinks he has earned a total of 48 points. Is he correct or incorrect? Explain your answer and provide equations to support your explanation.

Carmen and Sam move on to Level 2 of the video game. In Level 2, one full bucket holds 3 stars, but each star is worth more than 2 points.

**Part C** Copy the table below onto your answer document. Complete all the empty cells in the copied table. Explain your answers and include equations to support your explanation.

**Level 2 Results**

| Name | Full Buckets | Stars Collected | Points Earned |
|---|---|---|---|
| Carmen | 5 | | 60 |
| Sam | | 9 | |

**RUBRIC**

| | |
|---|---|
| **Score Point 4** | Student scores 4 points. |
| **Score Point 3** | Student scores 3 – 3.5 points. |
| **Score Point 2** | Student scores 2 – 2.5 points. |
| **Score Point 1** | Student scores 0.5 – 1.5 points.<br>OR<br>Student demonstrates minimal understanding of multiplication or division to solve word problems involving multiplicative comparison. |
| **Score Point 0** | Student's response is totally incorrect or irrelevant. |
| **Blank** | No student response. |
| **Note:** No part can be incomplete or incorrect and receive full credit. | |

**Score Points**

**Part A** score 1 point correct answer with correct and complete work or explanation
OR
score 0.5 point correct answer with incomplete work or explanation
OR
incorrect answer with complete work or explanation
OR
some correct procedure
OR
vague explanation only

**Part B** score 1 point correct answer with correct and complete work or explanation
OR
score 0.5 point correct answer with incomplete work or explanation
OR
some correct procedure
OR
vague explanation only

**Part C** score 2 points correct answers with correct and complete work or explanation
OR
score 1.5 points correct answers with incomplete work or explanation
OR
score 1 point correct answers with no work or no explanation
OR
incorrect answers due to miscalculation (work must be shown)
OR
at least one correct answer with some work or explanation
OR
score 0.5 point some correct procedure
OR
vague explanation only

**Correct answer:**

**Part A** Carmen is not correct.

Carmen has 4 full buckets rendering $4 \times 3 = 12$ stars. Each star is worth 2 points. Carmen has earned 24 points, $12 \times 2 = 24$, not 14 points so she is not correct.

OR similar explanation

**Part B** Sam is correct.

Twice as many full buckets as Carmen is 8, $4 \times 2 = 8$. Sam has 8 full buckets rendering $8 \times 3 = 24$ stars. Each star is worth 2 points. Sam has earned 48 points, $24 \times 2 = 48$, so he is correct.

OR similar explanation

**Part C**

**Level 2 Results**

| Name | Full Buckets | Stars Collected | Points Earned |
|---|---|---|---|
| Carmen | 5 | 15 | 60 |
| Sam | 3 | 9 | 36 |

Carmen has 5 buckets and each bucket has 3 stars so she has a total of 15 stars $(5 \times 3 = 15)$.

Sam filled 3 full buckets because he had 9 stars and it takes 3 stars to fill a bucket $(9 \div 3 = 3)$.

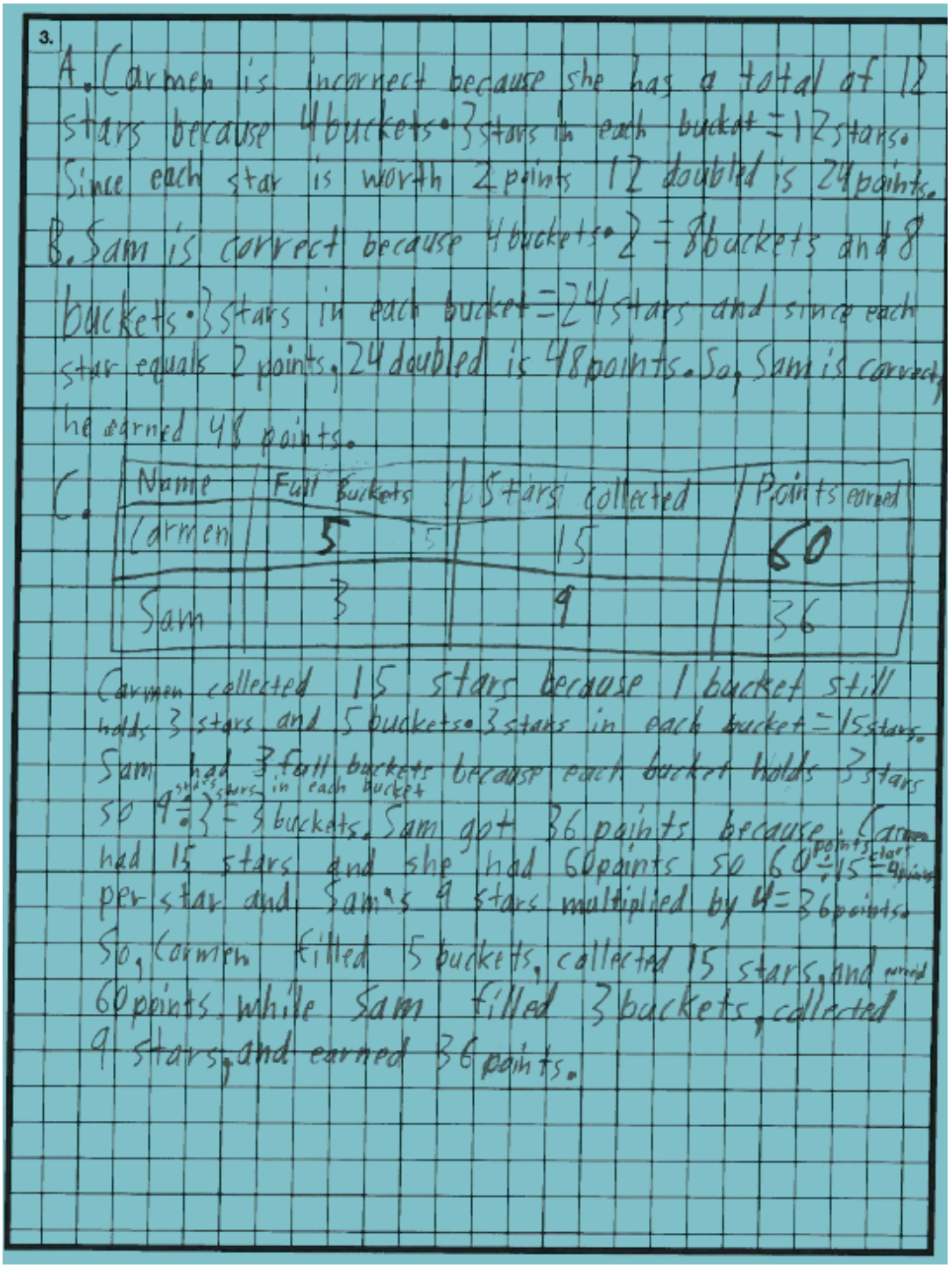
He also earned 36 points because each star is worth 4 points because Carmen earned 60 points with 15 stars $(60 \div 15 = 4)$.

OR similar explanation or work

**GRADE 4 —Mathematics**

# Annotated Student Response

**SAMPLE 4-POINT RESPONSE** **NOTES**



3.

A. Carmen is incorrect because she has a total of 12 stars because 4 buckets • 3 stars in each bucket = 12 stars. Since each star is worth 2 points 12 doubled is 24 points.

B. Sam is correct because 4 buckets • 2 = 8 buckets and 8 buckets • 3 stars in each bucket = 24 stars and since each star equals 2 points, 24 doubled is 48 points. So, Sam is correct, he earned 48 points.

C.

| Name | Full Buckets | Stars collected | Points earned |
|---|---|---|---|
| Carmen | 5 | 15 | 60 |
| Sam | 3 | 9 | 36 |

Carmen collected 15 stars because 1 bucket still holds 3 stars and 5 buckets • 3 stars in each bucket = 15 stars. Sam had 3 full buckets because each bucket holds 3 stars so 9 stars ÷ 3 stars in each bucket = 3 buckets. Sam got 36 points because Carmen had 15 stars and she had 60 points so 60 points ÷ 15 stars = 4 points per star and Sam's 9 stars multiplied by 4 = 36 points. So, Carmen filled 5 buckets, collected 15 stars, and earned 60 points. while Sam filled 3 buckets, collected 9 stars, and earned 36 points.

A 1.0

B 1.0

C 2.0

**GRADE 4 —Mathematics**

**ANNOTATION - 4-POINT RESPONSE**

A The student has a correct answer, "*Carmen is incorrect*", and explains, *"she has a total of 12 stars because 4 buckets · 3 stars in each bucket = 12 stars. Since each star is worth 2 points 12 doubled is 24 points."* (1.0 point)

B The student has a correct answer, *"Sam is correct because 4 buckets ·2 = 8 buckets and 8 buckets · 3 stars in each bucket = 24 stars and since each star is worth 2 points, 24 doubled is 48 points."* (1.0 point)

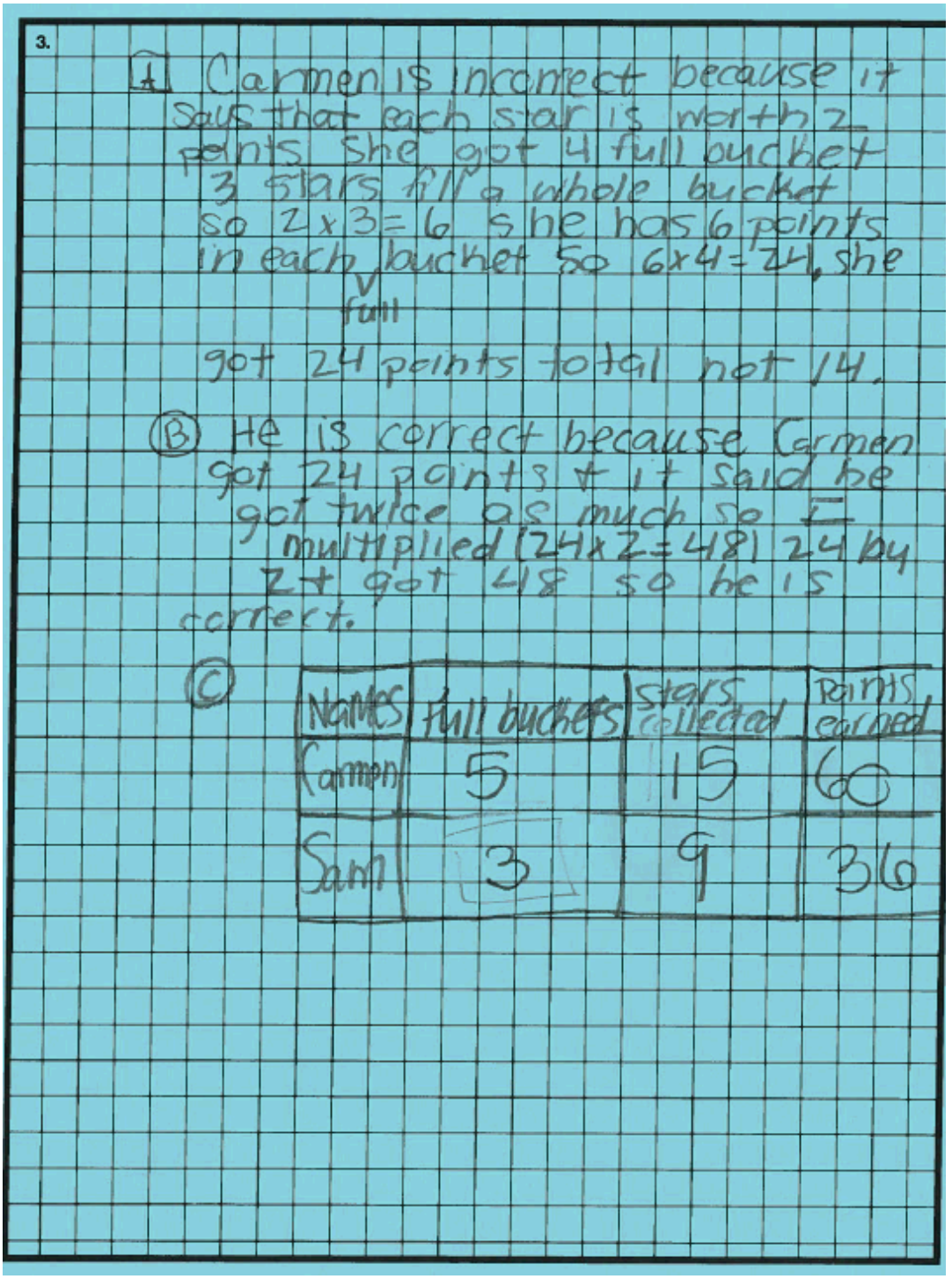
C The student enters the correct numbers in the 3 empty cells on the table and explains using equations, "*Carmen collected 15 stars because 1 bucket still holds 3 stars and 5 buckets ·3 in each bucket = 15 stars. Sam had 3 full buckets because each bucket holds 3 stars so 9 ÷ 3 = 3 buckets. Sam got 36 points because Carmen had 15 stars and she had 60 points so 60 ÷ 15 = 4 points per star and Sam's 9 stars multiplied by 4 = 36 points."* (2.0 points)

**Overall**, the student earns 4 points.

GRADE 4 —Mathematics

# Annotated Student Response

**SAMPLE 3-POINT RESPONSE** **NOTES**




A 1.0

B 1.0

C 1.0

**GRADE 4 —Mathematics**

**ANNOTATION - 3-POINT RESPONSE**

A The student has a correct answer, "*Carmen is incorrect",* and explains the point system, *"…each star is worth 2 points she got 4 full bucket 3 stars fill a whole bucket so 2 x 3 = 6…so 6 x 4 = 24.". "She got 24 points total not 14."* (1.0 point)

B The student has a correct answer and a correct explanation, *"He is correct because Carmen got 24 points & it said he got twice as much so I multiplied (24 x 2 = 48) so he is correct."* (1.0 point)

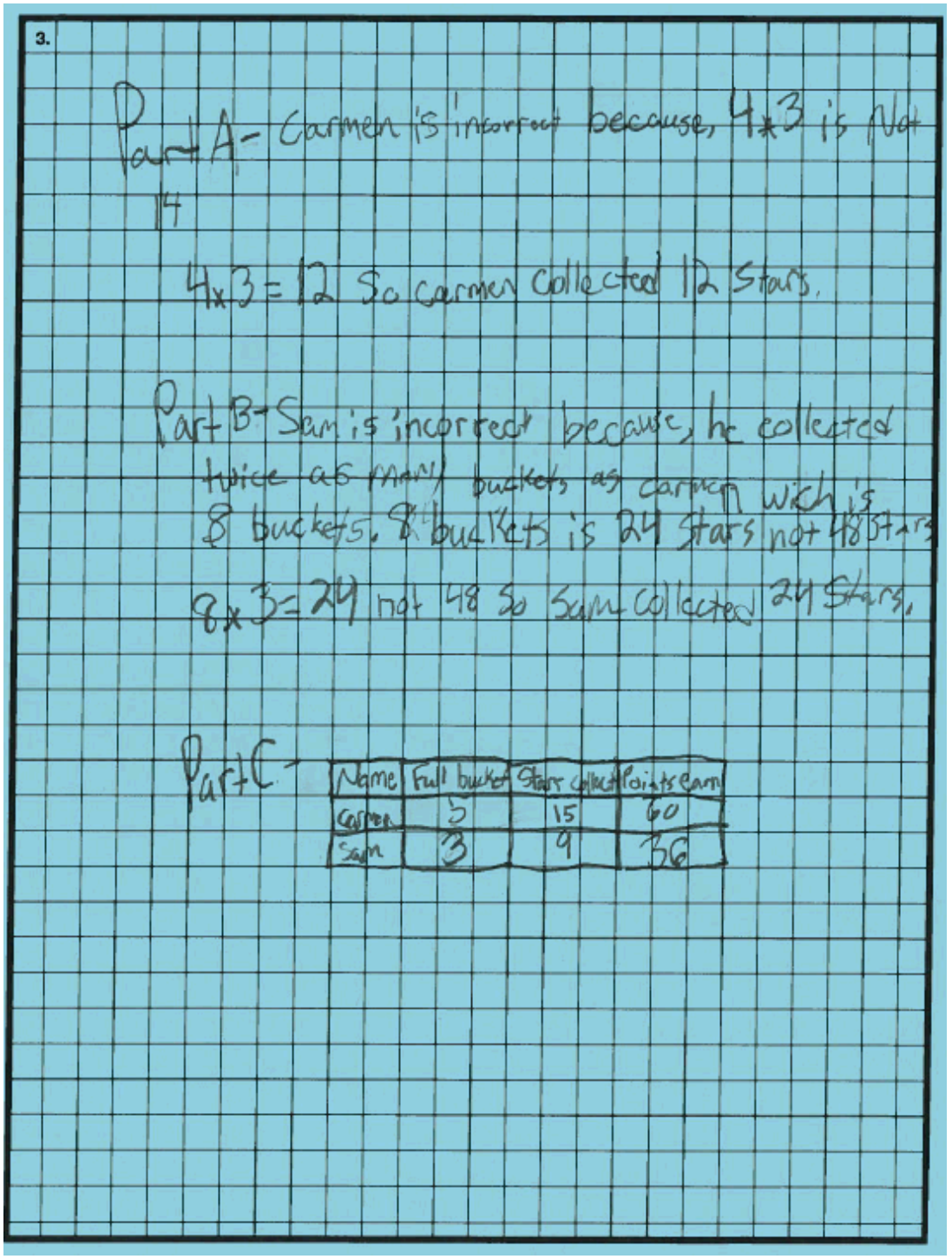
C The student enters the correct numbers in the 3 empty cells on the table but no work or explanation is shown. (1.0 point)

**Overall,** the student earns 3 points.

GRADE 4 —Mathematics

# Annotated Student Response

**SAMPLE 2-POINT RESPONSE** **NOTES**




A .5

B .5

C 1.0

**GRADE 4 —Mathematics**

## ANNOTATION - 2-POINT RESPONSE

A The student has a correct answer, "*Carmen is incorrect",* but the work shown is incomplete. The student correctly calculates the number of stars collected, *"4 x 3 = 12 so Carmen collected 12 stars"*, but fails to multiply the number of stars by 2 to calculate the number points earned. (0.5 points)

B The student has an incorrect answer, "*Sam is incorrect",* but the work shown contains some correct procedure. The student correctly calculates the number of stars collected, *"8 x 3 = 24 not 48 so Sam collected 24 stars"*, but fails to multiply the number of stars by 2 to calculate the number of points earned. (0.5 points)

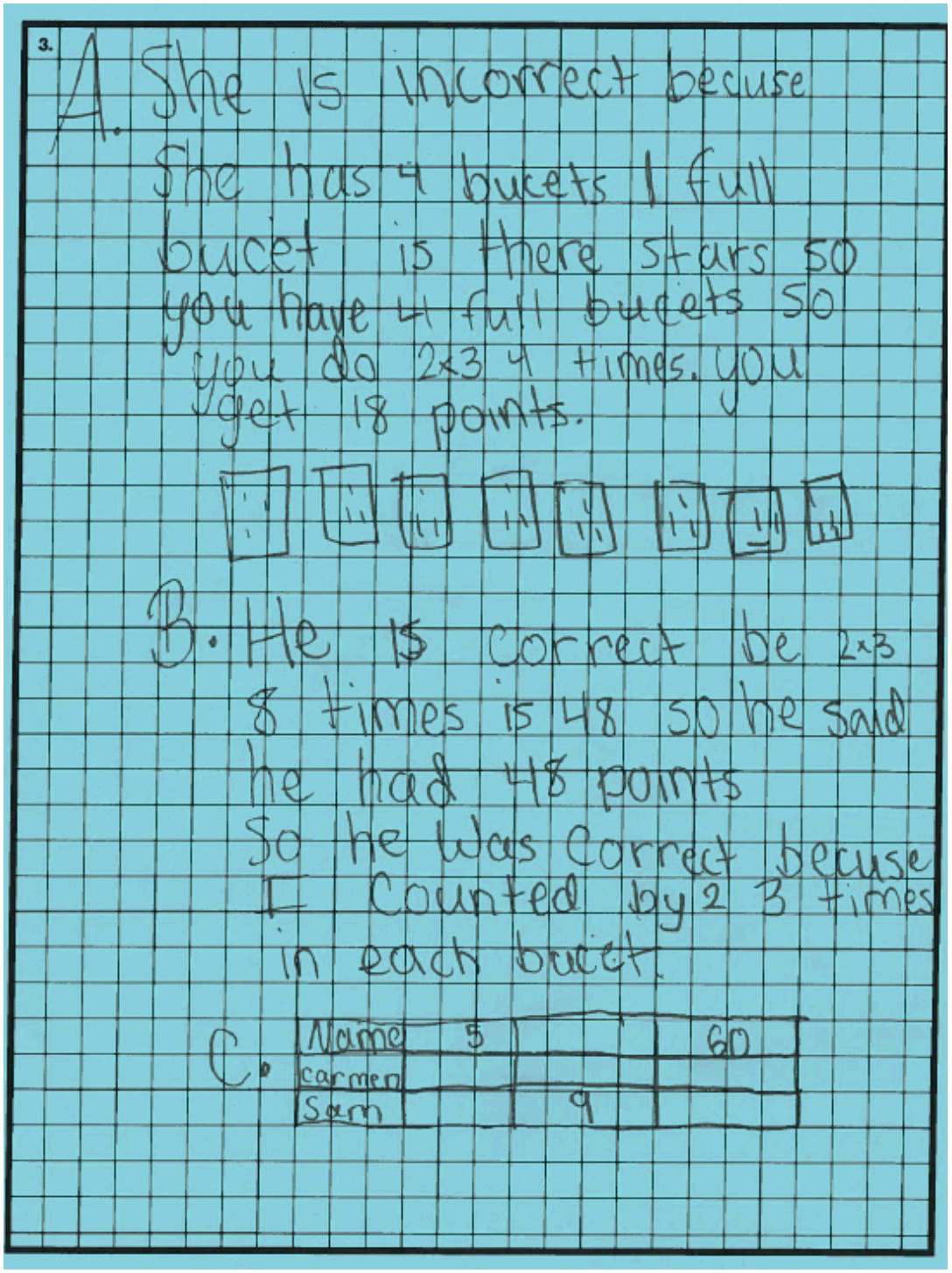
C The student enters the correct numbers in the 3 empty cells on the table but no work or explanation is shown. (1.0 point)

**Overall,** the student earns 2.0 points.

**GRADE 4 —Mathematics**

# Annotated Student Response

**SAMPLE 1-POINT RESPONSE** **NOTES**




A .5

B 1.0

C 0.0

**GRADE 4 —Mathematics**

## ANNOTATION - 1-POINT RESPONSE

A The student has a correct answer "*She is incorrect"* but the work shown is not completely correct *"…you do 2 x 3 4 times. You get 18 points."* (0.5 points)

B The student has a correct answer and a correct explanation *"He is correct be 2 x 3 8 times is 48 so he said he had 48 points so he was correct"*. (1.0 point)

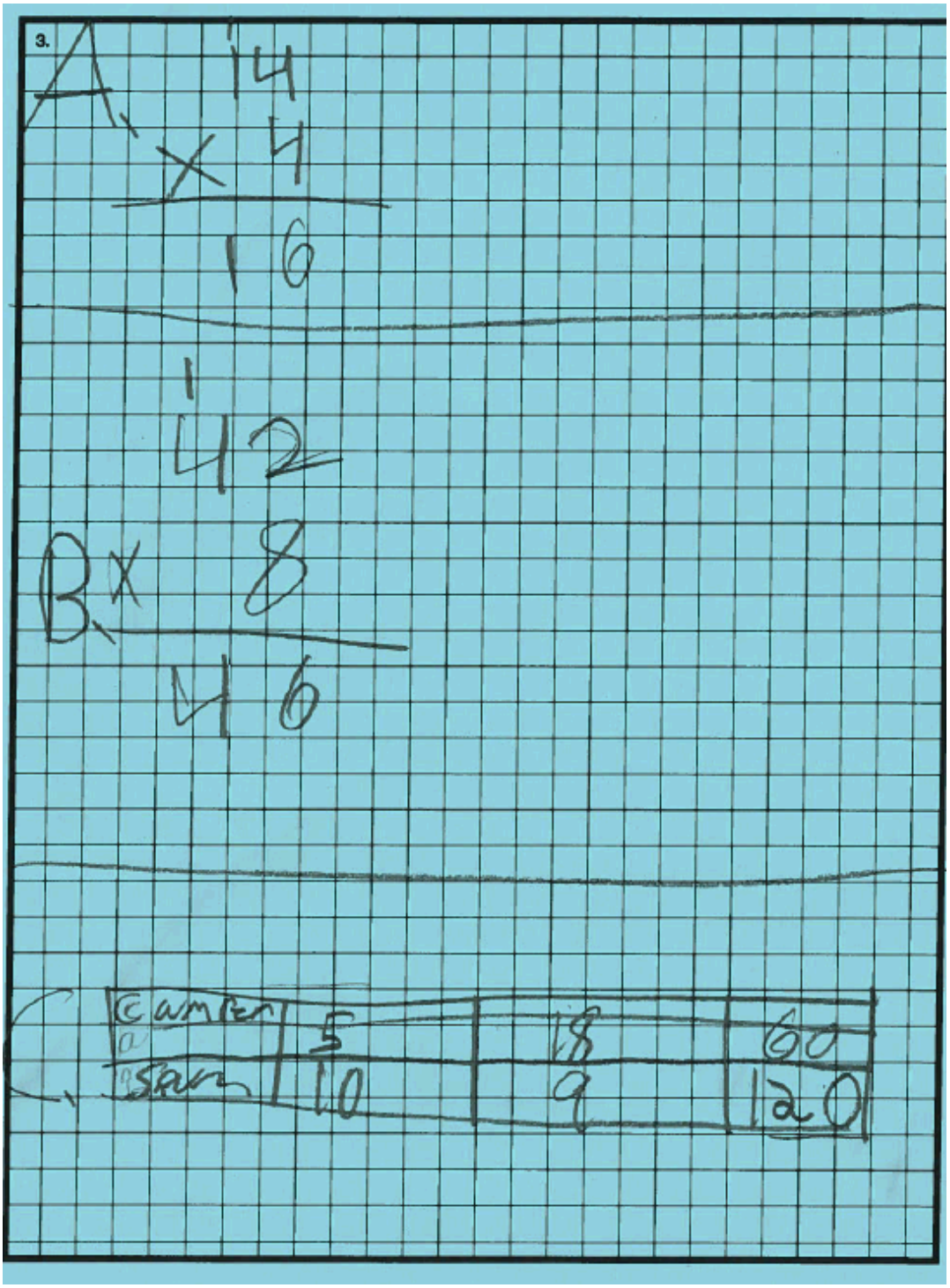
C The student does not complete any of the empty cells on the table, and no explanation or equations are provided. (0 points)

**Overall,** the student earns 1.5 points.

GRADE 4 —Mathematics

# Annotated Student Response

**SAMPLE 0-POINT RESPONSE** **NOTES**




A 0.0

B 0.0

C 0.0

**GRADE 4 —Mathematics**

**ANNOTATION - 0-POINT RESPONSE**

A The student does not answer the question and the work shown is incorrect. (0 points)

B The student does not answer the question and the work shown is incorrect. (0 points)

C The student completes the three empty cells with incorrect values and no explanation or work is shown. (0 points)

**Overall,** the student earns 0 points.

Item Information

| Question Number | Key | DOK* | KCAS Primary Standard** |
|---|---|---|---|
| 1 | B | 2 | 4.NBT.6 |
| 2 | B | 2 | 4.OA.3 |
| 3 | C | 2 | 4.NBT.2 |
| 4 | B | 2 | 4.G.1 |
| 5 | D | 3 | 4.NF.3.d |
| 6 | NA | 2 | 4.MD.3 |
| 7 | NA | 2 | 4.NF.4.c |
| 8 | NA | 3 | 4.OA.2 |

*DOK is the abbreviation for Depth of Knowledge. Please note that DOK is associated to the complexity level of an assessment item and is not aligned to the standard. Further information regarding DOK can be accessed on the Kentucky Department of Education Web site: http://education.ky.gov/curriculum/docs/Pages/Content-Specific-Core-Content-for-Assessment-DOK-Support-Materials.aspx

**Further information regarding Common Core Standards can be accessed on the Common Core Web site: http://www.corestandards.org